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Summer Chum Salmon Recovery Plan – November 15, 2005

2. GOALS OF THE SUMMER CHUM SALMON RECOVERY PLAN

Recovery planning for summer chum salmon must include 1) political, economic, historical, and cultural values; 2) natural resource management concerns; 3) legal requirements (e.g., ESA, Treaties) and 4) biodiversity. The Summer Chum Salmon Recovery Plan (SRP) recognizes that the recovery goals and objectives must reflect a clear understanding of the concerns of the people living within the geographic boundaries of the summer chum salmon ESU. Many characteristics and ecological functions at the landscape scale, which influence summer chum salmon survival and persistence, are controlled by hydrologic and geomorphic conditions in the watersheds that encompass the summer chum salmon ESU. Changes in land use and development can influence these characteristics and functions. Current and future land use and development trends must be assessed and considered in the development of recovery actions. Though the focus of this SRP is the recovery of a single species, summer chum salmon, recovery planning must consider a diverse community, including humans.

2.1. Overall Goals

The overall goal of the Summer Chum Salmon Recovery Plan is to recover and obtain delisting of the summer-timed chum salmon populations in Hood Canal and the eastern Strait of Juan de Fuca watershed, including restoration of populations in watersheds where summer chum have been extirpated. This recovery plan adopts the overall goal presented in the Summer Chum Salmon Conservation Initiative (SCSCI). The SCSCI (WDFW and PNPTT 2000) states the goal as:

“To protect, restore and enhance the productivity, production and diversity of Hood Canal summer chum salmon and their ecosystems to provide surplus production sufficient to allow future directed and incidental harvests of summer chum salmon.”

The Summer Chum Salmon Recovery Plan seeks to maintain current population structure and distribution of summer chum and restore distribution in previously occupied areas within the species native range.

The HCCC Board, in considering a recovery plan that can be implemented and meets the desires of the land-use (Counties) and Tribal authorities, further adds that a summer chum salmon recovery plan be designed to provide:

- the Counties with as much certainty as is possible regarding development, growth and land use,
- as much certainty as is possible for Tribal goals and objectives, and
- as much certainty as is possible for private landowners.

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Certainty means that the SRP will strive to give the Counties, Tribes and public a clear understanding of salmon recovery, the actions that it will take to achieve recovery, and at what economic cost. It is not clear how much biological diversity, population structure, and abundance will be necessary for the long-term recovery of summer chum salmon. National Marine Fisheries Service (NMFS) scientists will ultimately recommend whether these biological and population structure elements will likely be met by the SRP. Recovery and long term sustainability of a threatened species require adequate reproduction for replacement of losses due to natural mortality factors (including disease and random events), sufficient genetic robustness to avoid inbreeding depression and allow adaptation, sufficient habitat (type, amount, and quality) for long-term population maintenance, and the elimination or control of threats (which may also include having adequate regulatory mechanisms in place).

Scientific studies and technical assessments can only provide a part of the answer. “Society must decide what degree of biological security would be desirable and affordable if it could be achieved, i.e., the desired probability of survival or extinction of natural populations, over what time and what area, and at what cost” (NRC 1996). The SRP will articulate the costs and develop actions that can be implemented in a reasonable timeframe.

The HCCC Board said that the SRP must also:

- Give credit for salmon recovery actions and measures that have been taken to date by the Counties and Tribes, and
- Show that the burden of salmon recovery goes beyond local governments (to State and Federal governments and associated entities).

The Counties, Tribes, and citizen groups have implemented many projects and regulatory measures that are aiding summer chum. The SRP will build on those efforts, support their continuation, and support the development of new efforts.

Summer chum salmon recovery will be expensive. Those expenses will include capital costs for new projects as well as operations and maintenance costs for existing projects. County and Tribal budgets are not sufficient alone to cover these costs. Solutions will be complex. They must be based on sound scientific information. They will also need consensus on the size of the investments, and commitments needed, and the allocation of costs. The solutions will have to be regionally based just as summer chum salmon restoration limits have regional variations. Significant financial, policy, and programmatic assistance from both the State of Washington and the Federal government will be necessary.

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2.2. Summer Chum Salmon Recovery Goals

Recovery goals presented in this section are designed to provide numeric targets of summer chum salmon abundance and escapement for the purposes of recovery planning. The science that governs the development of the numeric goals is provisional and dynamic. The science depends on our current on-going and future ability to gather the appropriate data to measure recovery parameters, including abundance, productivity, and diversity. The initial numeric goals in this section will be used for the development of recovery actions. This SRP seeks to provide habitats that function at a level where summer chum salmon, as we currently understand their biology, can thrive and persist.

2.2.1. Puget Sound Technical Recovery Team Summer Chum Salmon Viability Analysis and Population Identification

The Puget Sound Technical Recovery Team (TRT) is the NMFS technical group charged with addressing the ESA objective of defining measurable criteria for determining when delisting is warranted. The TRT seeks to: (1) identify population and ESU de-listing goals; (2) characterize habitat/fish abundance relationships; (3) identify the factors for decline and limiting factors for each ESU; (4) identify the actions that are important for recovery; (5) identify research, evaluation, and monitoring needs; and (6) serve as science advisors to groups charged with developing measures to achieve recovery. The TRT is appointed by NMFS to be science advisors for recovery planning. The TRT has developed planning targets for most of the chinook populations identified for the Puget Sound Chinook ESU (PSTRT 2002). As of November 15, 2005, similar TRT viability goals and planning targets have not been completed for summer chum salmon. The TRT has not yet identified population abundance, diversity, spatial structure and productivity levels necessary for Hood Canal summer chum ESU viability. WDFW and the PNPTT developed interim recovery goals that may be reviewed as interim viability parameters (PNPTT and WDFW 2003). These goals apply to abundance, escapement, productivity and diversity of the natural-origin component of the summer chum ESU. When realized, the recovery goals are expected to provide, on average, sufficient surplus abundance to allow for directed and incidental harvests of summer chum salmon. Due to a lack of adequate understanding of how habitat affects potential stock production, productivity, and diversity, habitat is not linked directly to the interim recovery goals. The PNPTT and WDFW (2003) interim recovery goals include: abundance and escapement recovery thresholds; a productivity recovery threshold; interim recovery goals' criteria for abundance, spawning escapement and productivity; and diversity interim recovery goals.

The TRT is considering the identification of two independent summer chum salmon populations that comprise the ESU with an associated viability analysis. The TRT has provisionally identified these two independent populations of Hood Canal/Eastern Strait of Juan de Fuca summer chum salmon as: 1) Hood Canal

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stock aggregations and 2) Strait of Juan de Fuca stock aggregations.¹³ Stocks included in the Hood Canal aggregation are the extant stocks originating in Big Quilcene, Little Quilcene, Dosewallips, Duckabush, Hama Hama, Lilliwaup, and Union watersheds as well as those being supplemented in Big Beef Creek and the Tahuya River. Included in the Strait of Juan de Fuca aggregations are extant stocks originating in Salmon/Snow Creeks and Jimmycomelately Creek as well as stocks supplemented into Chimacum Creek. Any summer chum salmon that may be spawning in the Dungeness River are also included in the Strait of Juan de Fuca aggregation. In order for the ESU to be declared viable (and recovered), both populations need to achieve a low risk status.

The TRT's analysis is a work in progress and is expected to be available at a later date, but likely not in time for the initial development and completion of this SRP. The TRT will be describing the abundance and productivity associated with a low risk summer chum salmon population. Also discussed will be how spatial structure and diversity of the populations will be improved as stocks on both the eastern and western sides of Hood Canal are restored. Until the TRT analyses are available and have critical review it will be difficult to relate the general viability discussion with specific measures being recommended for the recovery of summer chum salmon. It is understood that the approach being taken in this SRP towards the recovery of summer chum salmon in the Hood Canal/Eastern Strait of Juan de Fuca ESU will need to be reviewed and analyzed by the TRT. It should be noted, however, that recovery planning according to the guidance of the TRT (PSTRT 2003) is problematic, absent definition by the TRT of the independent populations being considered, and the appropriate viability analyses being completed. Efforts to develop this SRP continue to be coordinated with the on-going analyses and deliberations of the TRT. Results from the TRT's efforts will be incorporated into this SRP as appropriate and feasible.

2.2.2. Co-manager (WDFW and PNPTT) Interim Summer Chum Salmon Recovery Goals

This SRP uses the interim targets established by the co-managers, in lieu of viability goals and targets from the TRT. Details of these targets are presented in the document, *Interim Summer Chum Salmon Recovery Goals* (PNPTT and WDFW 2003). These interim recovery goals are not viability goals similar to those developed for Puget Sound chinook by the PSTRT (2002). They are "tangible targets against which the success of recovery measures can be measured" (PNPTT and WDFW 2003). The *Summer Chum Salmon Conservation Initiative* (SCSCI), released in 2000 by the Washington Department

¹³ A draft TRT report entitled, *Independent Populations of Summer Chum Salmon: Results of Genetic Analyses*, dated 29 January 2004, has limited distribution and review, but provides the basis for the identification of the populations.

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of Fish and Wildlife and the Point No Point Treaty Tribes (WDFW and PNPTT 2000), provides some of the technical basis for the protection and recovery of summer chum salmon in Hood Canal and Eastern Strait of Juan de Fuca watersheds. The original SCSCI did not describe specific recovery goals. TRT viable salmonid population (VSP) parameters and targets for summer chum salmon are in development, as described in section 2.2.1 above. NMFS Staff participated in the development of the co-managers' interim recovery goals and the TRT is in the process of reviewing those goals and methods of development. As the TRT considers recovery goals for Hood Canal summer chum salmon it is expected they will take into account the interim recovery goals as presented in PNPTT and WDFW (2003). Until the TRT viability analysis for summer chum salmon is complete and available for critical review it will not be possible to determine whether the co-manager goals and the recommended actions described in this SRP will adequately address summer chum salmon recovery.

PNPTT and WDFW (2003) describes, *“interim natural-origin-recruit recovery goals for abundance, escapement, productivity and diversity.”* Tables 2.1, 2.2, and 2.3 describe the co-managers' view of abundance, productivity, and spatial structure for the stocks that comprise the Hood Canal/Eastern Strait of Juan de Fuca ESU. Table 2.4 summarizes the co-managers' approach to the restoration and maintenance of population diversity.

The co-managers recognize that the recovery goals they developed are based on currently available, and limited, information with the expectation that they may be revised as additional information is generated. The co-managers, however, *“believe that these interim recovery goals provide effective initial targets to use in managing for recovery and that by meeting the goals, the risk of extinction will be reduced and the stocks will become more resilient while moving toward healthy abundance levels”* (PNPTT and WDFW 2003).

PNPTT and WDFW (2003) provided abundance and spawning escapement recovery thresholds for eight extant populations within the ESU that were estimated based on run sizes prior to population declines (Table 2.1). The status of the summer chum population in the Dungeness River is unknown due to a lack of historical or current population abundance data, and no thresholds were developed for this ninth extant population. A productivity recovery threshold of 1.6 recruits per spawner is proposed. This threshold is within a reasonable range of observed values and, when achieved, would accommodate liberalization of some restrictions on the harvest of salmon species commingled with summer chum salmon, while ensuring sustainability.

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Table 2.1. Summary of the co-managers' abundance and escapement thresholds modified from the co-managers' Interim Summer chum salmon recovery goals (PNPTT and WDFW 2003).

Hood Canal aggregation

Stocks	Abundance	Escapement
Quilcene	4,570	2,860
Dosewallips	3,080	1,930
Duckabush	3,290	2,060
Hama Hama	6,060	3,790
Lilliwaup	3,310	1,960
Union	550	340

Strait of Juan de Fuca aggregation

Stocks	Abundance	Escapement
Salmon/Snow	1,560	970
Jimmycomelately ¹⁴	520	330

Each recovery goal identified in Table 2.1 is linked to abundance, escapement and productivity criteria that must be met for the recovery goal to be achieved. Criteria were developed for the individual stocks as well as for the ESU. For each individual stock, all of the following criteria described in Table 2.2 must be met.

¹⁴ Please note the following concern, from Crain (2003): "There is a concern that these interim targets for Jimmycomelately Creek summer chum may represent a moderate risk of extinction using the methods of Allendorf et. al (1997), which specify that a population is at moderate risk of extinction if the total escapement population per generation is less than 2,500 or if the effective population size is less than 500. However, the Allendorf et. al assumptions were theoretical, and a population may be viable at sizes slightly below those the authors predicted. Additionally, these interim targets are based upon observed escapements during the 1970's and early 1980's. It is entirely possible that the population was already in decline by that time, as significant habitat alteration to the creek began in the late 1800's. Finally, it may be that the Jimmycomelately Creek stock is part of a larger population that included the Dungeness River and/or Discovery Bay stocks.

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Table 2.2. Co-manager recovery criteria for each individual stock (PNPTT and WDFW 2003).

For each individual stock, all of the following criteria must be met:	
	▪ The mean natural origin abundance and mean natural origin spawning escapement of each stock shall meet or exceed the abundance and escapement thresholds described in Table 2.1, over a period of the most recent 12 years.
	▪ The natural origin abundance and natural origin spawning escapement of each stock must be lower than the respective stock's critical thresholds (or, where applicable, minimum escapement flag) ¹⁵ in no more than 2 of the most recent 8 years and, additionally, in no more than 1 of the most recent 4 years.
	▪ Natural recruits per spawner shall average at least 1.6 over the 8 most recent brood years for which estimates exist and no more than 2 of the 8 years shall fall below 1.2 recruits per spawner.

The required criterion for recovery at the ESU level which addresses spatial structure and diversity are summarized in Table 2.3.

Table 2.3. Co-managers' ESU-wide "natural" recovery criteria (PNPTT and WDFW 2003).

For the overall Hood Canal/Eastern Strait of Juan de Fuca ESU:	
	▪ No less than the extant 6 Hood Canal natural stocks and 2 Strait natural stocks must meet all the individual stock recovery criteria described in Tables 2.1 and 2.2. The corollary to this criterion is that, on average, the ESU-wide abundance must meet or exceed the sum of the individual stock thresholds and the ESU-wide "natural" escapement must meet or exceed the sum of individual stock escapement thresholds; also, on average, the ESU-wide "natural" productivity must meet or exceed 1.6 recruits per spawner.

Table 2.4 further summarizes the co-managers' approach regarding population diversity.

¹⁵ Critical abundance and escapement thresholds have been defined for all management units in the SCSCI that, except for the mainstem Hood Canal management unit, are currently equivalent to individual stocks. Minimum escapement flags have been described for individual stocks of the mainstem Hood Canal management unit. See Appendix 1.5 in WDFW and PNPTT (2003b) for a description of the critical thresholds, minimum escapement flags and their derivation.

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Table 2.4. Co-managers' approach to the restoration and maintenance of population diversity for the Hood Canal/Eastern Strait of Juan de Fuca ESU (PNPTT and WDFW 2003).

Provisions intended to protect and restore diversity of the summer chum salmon populations in Hood Canal and the Strait of Juan de Fuca:	
▪	Support planning and implementation of effective habitat protection and recovery actions by the agencies and local governments who have the jurisdiction.
▪	Rebuild by natural or artificial means, (under the guidelines of the SCSCI) the existing summer chum salmon stocks to meet their abundance and escapement recovery goals.
▪	Reestablish, by natural or artificial (i.e., reintroduction) means (under the guidelines of the SCSCI,) the selected extinct summer chum salmon stocks, where feasible.

The co-managers' interim recovery goals are consistent with the overall goal as stated in the WDFW and PNPTT (2000). That goal seeks to establish a level of production of summer chum salmon that is "sufficient to allow future directed and incidental harvests of summer chum salmon" (WDFW and PNPTT 2000). The interim measures are also consistent with the parameters of abundance, spatial distribution, productivity and diversity that are the general guidelines that identify viable salmonid populations (McElhany et al. 2000). They are consistent with the current technical approach being employed by the PSTRT. And, they provide for an appropriate initial approach with which to develop this SRP.¹⁶

2.3. Summer Chum Salmon Conservation Initiative Objectives

Part Four of the SCSCI describes its objectives (WDFW and PNPTT 2000). The Summer Chum Salmon Recovery Plan is designed to support these objectives, actions, and strategies for Artificial Production, Ecological Interactions, and Harvest Management.

¹⁶ As of December 2004, it is not clear whether the Co-managers' interim recovery goals as established in SCSCI 2003 are within the ranges of abundance, productivity, diversity and spatial structure that are being envisioned by the TRT. After completion of this initial SRP, the TRT viability analysis may provide different targets and criteria that will define recovery. This SRP, lacking any viable alternatives, will use the co-managers' goals for recovery planning purposes with the understanding that these goals ultimately may not be descriptive of summer chum salmon viability as envisioned by the TRT. We believe, however, that achievement of these goals will be a tremendous accomplishment and will likely define recovery, or at least send summer chum salmon populations on a trajectory towards recovery.

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2.3.1. Artificial Production

The SCSCI's Artificial Production program is designed to supplement populations identified as at moderate or high risk of extinction. The program also allows the reintroduction of summer chum salmon to watersheds where historical populations have been lost. The Artificial Production program is coordinated with other aspects of salmon recovery and is designed to minimize ecological and genetic risks. More details of the Artificial Production program for summer chum salmon are presented in section 5 of this SRP.

2.3.2. Ecological Interactions

The SCSCI assessed the ecological interactions between summer chum salmon and other species (WDFW and PNPTT 2000). The SCSCI concluded that there was little likelihood that the prescribed artificial production programs for summer chum salmon would substantially impact other species. The competitive interactions with other juvenile salmonids would be limited as the number of artificially produced summer chum salmon is relatively small. Since summer chum artificially produced are released at a small size, predation effects on other fishes are likely not a concern.

More important concerns are impacts on summer chum from other species, most notably other salmonids and marine mammals. Potential impacts from other salmonids include effects of hatchery operations, fish disease transfer, competition and predation. The SCSCI describes these region-wide factors for decline and offers descriptions of actions to address these impacts (WDFW and PNPTT 2000). Specifically, the SCSCI seeks to “eliminate and reduce the negative hatchery interactions with summer chum” salmon survival (WDFW PNPTT 2000). Included are recommendations to reduce the potential for interaction between hatchery juvenile salmon and summer chum juveniles in migration and feeding areas by delaying hatchery fish releases until most summer chum salmon have emigrated seaward. Also included is a recommendation to assess the impacts from fall chum spawning with in the same stream reaches in which summer chum spawn.

The SCSCI also attempts to “assess and respond to other potential negative species interactions with summer chum” (WDFW and PNPTT 2000). WDFW and the Washington Cooperative Fish and Wildlife Research Unit (WACFWRU) have been conducting research on Hood Canal salmon stocks and marine mammal predation since 1998. The result of their research is pending and will be incorporated, as appropriate, in this SRP when it becomes available. The research attempts to estimate seal predation rates on returning salmonids to certain Hood Canal streams between 1998-2001 (WDFW and WACFWRU 2004 in progress).

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2.3.3. Harvest Management

The SCSCI has also developed harvest management provisions. The objective of these provisions is “to manage fisheries in a manner that will allow the rebuilding and maintenance of self-sustaining summer chum populations throughout Hood Canal and eastern Strait of Juan de Fuca, while maximizing harvest opportunities on co-mingled salmon species” (WDFW and PNPTT 2000). The basic harvest management strategy utilizes what the SCSCI considers a conservative four-way control mechanism: 1) a base set of conservative fishing regulations, 2) abundance and escapement thresholds that trigger adjustments to the fishing regime, 3) exploitation rate objectives that will result in changes to the harvest regime if not met, and 4) overall stock assessment criteria that will affect all plan provisions, including harvest, if not satisfactorily met at periodic plan reviews (WDFW and PNPTT 2000). More details of the harvest management approach being developed and implemented by the co-managers (WDFW and PNPTT) and can be found in section 4 of this SRP.

2.4. Summary

The Summer Chum Salmon Recovery Plan is designed to address 1) political, economic, historical, and cultural values; 2) natural resource management concerns; and 3) biodiversity goals and objectives. Because our knowledge is limited, there is some uncertainty regarding the goals and objectives that require active monitoring and adaptation as new knowledge of summer chum salmon habitats is gained. Section 3 of the SRP, *The Strategic Approach and Management Strategy to Achieve the Goals of the Summer Chum Salmon Recovery Plan*, provides the context for the co-manager recovery goals. It also describes the design for the achievement of these goals. Section 3 will also describe the Summer Chum Salmon Recovery Plan management strategy and categories of actions that are expected to achieve the goals set out in section 2 above. The management strategy will be the guidance for the identification, development, and prioritization of recovery actions and projects. Specific projects and site-specific actions are described in sections 7-12 of this SRP.